

AMENDMENTS TO THE CLAIMS

1. (Cancelled)
2. (Cancelled)
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18. (Cancelled)
19. (Cancelled)
20. (Previously Presented) A configuration for an optical fiber ring network, comprising:  
  
two or more nodes, each node including,  
  
a multiplexing device,

a client device, and

redundant signal connections between the multiplexing device and the client device; and

redundant signal paths connecting the nodes, each of the redundant signal paths including an optical fiber link operable to transmit data bi-directionally between each pair of connected nodes,

wherein the multiplexing device is configured to selectively transmit outgoing data from the client device, and selectively receive incoming data destined for the client device, over each of the redundant signal paths, the multiplexing device being selectively linked to the client device for data communications by each of the redundant signal connections.

21. (Previously Presented) The configuration of claim 20, wherein the redundant signal connections includes a primary connection and a backup connection each being operable to convey the incoming and outgoing data between the multiplexing device and the client device, the backup connection enabling the incoming and outgoing data to be routed around a link failure occurring in the primary connection.

22. (Previously Presented) The configuration of claim 20, wherein the redundant signal connections include,

first and second link cards, each operable to communicate data between the multiplexing device and the client device; and

a switching apparatus operable to activate one of the first and second link cards, wherein

the activated link card conveys the outgoing data from the client device to the multiplexing device, and conveys the incoming data from the multiplexing device to the client device.

23. (Previously Presented) The configuration of claim 22, wherein the activated link card is a Fiber Channel (FC) link card.

24. (Previously Presented) The configuration of claim 22, wherein

the redundant data paths include a first and second data path;

the multiplexing device includes a first and a second multiplexing unit configured to transmit the outgoing data and receive the incoming data over the first and second signal path, respectively; and

the activated link card selectively links the client device to each of the first and second multiplexing units for data communications.

25. (Previously Presented) The configuration of claim 22, wherein the first link card is configured to operate according to

Fibre Channel (FC) protocol and the second link card is configured to operate according to Ethernet protocol.

26. (Previously Presented) The configuration of claim 20, wherein

the multiplexing device includes a coarse optical wavelength multiplexer and demultiplexer operable to transmit a first data stream over the optical fiber cable using a first optical wavelength and to receive a second data stream over the optical fiber cable using a second optical wavelength.

27. (Previously Presented) An apparatus for use at a node of an optical fiber ring network, comprising:

redundant data paths each including an optical fiber link operable to transmit data bi-directionally between the node and another node in the network; and

a multiplexing device configured to selectively transmit outgoing data from a client device, and selectively receive incoming data destined for the client device, over each of the redundant signal paths, the multiplexing unit being selectively linked to the client device for data communications by redundant signal connections,

wherein the multiplexing device is operable to selectively transmit and receive the incoming and outgoing data, respectively, according to Fibre Channel (FC) protocol.

28. (Previously Presented) The apparatus of claim 27, wherein the redundant signal connections include,

first and second link cards, each operable to communicate data between the multiplexing device and the client device; and

a switching apparatus operable to activate one of the first and second link card, wherein

the activated link card conveys the outgoing data from the client device to the multiplexing device, and conveys the incoming data from the multiplexing device to the client device.

29. (Previously Presented) The apparatus of claim 28, wherein the redundant data paths include a first and a second data path;

the multiplexing device includes a first and second multiplexing unit configured to transmit the outgoing data and receive the incoming data over the first and second signal path, respectively; and

the activated link card selectively links the client device to each of the first and second multiplexing units for data communications.

30. (Previously Presented) The apparatus of claim 29, wherein the first and second link cards each include an inbound FIFO frame buffer with memory capacity for storing at least 120 Fibre Channel frames sent by the client device to the link card and an outbound FIFO frame buffer with memory capacity for storing at least 120 Fibre Channel frames sent by another device to the link card for transmission to the client device.

31. (Previously Presented) The apparatus of claim 30, wherein the first and second link cards each include circuitry for exchanging buffer credit signals with another link card coupled thereto by one of the first and second optical fiber cables so as to pre-fill the outbound FIFO frame buffer with frames of data before the client device sends flow control messages to request the transmission of those data frames by another client device coupled to the other link card.

32. (Previously Presented) The apparatus of claim 30, wherein the first and second link cards each includes flow control circuitry for pre-filling the outbound FIFO frame buffer with frames of data before the client device sends flow control messages to request the transmission of those data frames.

33. (Previously Presented) The apparatus of claim 29, wherein the first and second link cards each include an inbound FIFO frame buffer for storing frames sent by the client device to the link card and an outbound FIFO frame buffer for storing frames sent by another device to the link card for transmission to the client device; and

the first and second link cards each store data into the inbound FIFO frame buffer and read data from the outbound FIFO frame buffer at a first clock rate associated with the client device, and read data from the inbound FIFO frame buffer for transmission to the multiplexer device and store data received from the multiplexer device into the outbound FIFO frame buffer at a second clock rate associated with the link card, whereby the data stream sent and received to and from the client device is retimed from the first clock rate to the second clock rate.

34. (Previously Presented) The apparatus of claim 33, wherein data streams sent and received to and from the client device are Fibre Channel data streams, the first clock rate is approximately 1.0625 Gbps, and the second clock rate is at least 1.25 Gbps.

35. (Previously Presented) The apparatus of claim 33, wherein the multiplexer device includes a smoothing circuit that retimes the first data stream sent from the client device from the second

clock rate to a third clock rate associated with the first multiplexer device, the multiplexer device transmitting the first data stream over one of the first and second optical fiber cables at the third clock rate.

36. (Previously Presented) The apparatus of claim 27, wherein the multiplexing device includes a coarse optical wavelength multiplexer and demultiplexer operable to transmit a first data stream over the optical fiber cable using a first optical wavelength and to receive a second data stream over the optical fiber cable using a second optical wavelength.

37. (Previously Presented) The apparatus of claim 2, wherein the optical wavelength division multiplexer and demultiplexer is a coarse optical wavelength division multiplexer and demultiplexer, which is operable to:

send the first data stream using, and receive the fourth data stream at, a first optical wavelength, and

send the second data stream using, and receive the third data stream at, a second optical wavelength.

38. (Previously Presented) The apparatus of claim 13, wherein the optical wavelength division multiplexer and demultiplexer is a

coarse optical wavelength division multiplexer and demultiplexer,  
which is operable to:

send the first combined data stream using, and receive the  
fourth combined data stream at, a first optical wavelength, and

send the second data stream using, and receive the third data  
stream at, a second optical wavelength.